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OMRON NT-Link

5.32 TesiMod - OMRON NT-Link

5.32.1 General Information

TesiMod operating terminals can be conveniently connected to all controllers that support the OMRON NT-Link protocol. The OMRON NT-Link protocol allows communication between one controller and up to 8 operating terminals. Since the Host-Link protocol is the default setting in OMRON controllers, this setting must be checked before using the NT protocol. See the controller's operating instructions.

5.32.1.1 Hardware

A RS232 or RS422/RS485 interface is used to connect TesiMod operating terminals to OMRON controllers.

5.32.1.2 Telegram Mode

With the NT-Link, a distinction is made between two protocols. The 1:1 protocol is used for point-to-point connections while the 1:N protocol is used for multipoint connections.

5.32.1.3 Point-to-Point Connection

The 1:1 protocol is used for point-to-point connections. This means that only one operating terminal can be connected with one controller. Interfaces that can be used with this connection type are the RS232 or the RS422 / RS485 interface. A 4-wire cable must be used in conjunction with the RS422 / RS485 interface.

5.32.1.4 Multipoint Connection

The 1:N protocol is used for multipoint connections. Up to 8 operating terminals can be connected to one controller.
The controller must be configured to address at least two operating terminals. The connection must be established using a RS422 / RS485 interface. A 2-wire cable must be used to ensure a sufficient termination.

5.32.2 Protocol Parameters

5.32.2.1 Communication Interface Parameters

Parameters that can be defined for the communication interface are as follows.
Different default values are predefined for the parameters depending on the protocol.

1:1 NT-Link
Baud rate: 300, 600, 1200, 2400, 4800, 9600, **19200**, 38400
Data bits: 7, **8**
Parity: even, **odd**
Stop bits: **1**, 2
Handshake: **no handshake**

1:N NT-Link
Baud rate: 300, 600, 1200, 2400, 4800, 9600, 19200, **38400**
Data bits: 7, **8**
Parity: even, **odd**
Stop bits: **1**, 2
Handshake: **no handshake**
Default values in the programming software are in **bold** print.

5.32.2.2 Additional Parameters

5.32.2.2.1 Parameter Maximum Waiting Time for Response

This parameter specifies the maximum time the operating terminal waits for a response from the PLC.
The valid range of values is 50 ms to 65535 ms.
The default value in the programming software is 500 ms.

5.32.2.2.2 Parameter Delay until Connection Set-up

This parameter specifies the time the operating terminal waits before starting communication.
The valid range of values is 5 s to 255 s.
The default value in the programming software is 5 s.

5.32.2.2.3 Parameter NT Module Number

This parameter is used to set the NT module number for the operating terminal. If multiple operating terminals are connected to one controller, then a separate number must be specified for each operating terminal. Otherwise, a reliable communication between the operating terminals and the controller is not possible.
Valid values that can be specified as a NT module number range from 0 to 7.
The default value is 0.
The NT module number can also be set via the operating terminal by means of the system variable **ComSlaveNr**.

5.32.2.2.4 Parameter Protocol Mode

Selectable protocol modes are either 1:1 or 1:N. Ensure that this parameter and the setting specified for the controller match.

5.32.2.2.5 Parameter Priority

This parameter applies only in conjunction with the 1:N protocol.
If the priority is turned off, the master allocates the token sequentially to each station. If the parameter Priority is turned on, the master allocates every second token to the operating terminal.

5.32.2.2.6 Parameter Duplex Operation

Select the parameter **full duplex** when using a **RS232** interface.
The parameter **half duplex** applies only in conjunction with the **RS422 / RS485** interface.

5.32.2.2.7 Parameter PLC Type

Different data types are permitted depending on the controller type. Therefore, select either the PLC type C-Series or CV-Series.

5.32.3 Data Types

Data types for the C-series:

Mnemonic	Range	Address Width	Access
IR	0.0 to 511.15	Bit access	
IR	0 to 511	Word access	
IRd	0 to 510	Double-word access	
LR	0.0 to 63.15	Bit access	
LR	0 to 63	Word access	
LRd	0 to 62	Double-word access	
HR	0.0 to 99.15	Bit access	
HR	0 to 99	Word access	
HRd	0 to 98	Double-word access	
AR	0.0 to 27.15	Bit access	
AR	0 to 27	Word access	
ARd	0 to 26	Double word access	
DM	0.0 to 9999.15	Bit access	
DM	0 to 9999	Word access	
DMd	0 to 9998	Double word access	
EM	0.0 to 6143.15	Bit access	
EM	0 to 6143	Word access	
EMd	0 to 6142	Double-word access	
TC	0 to 511	Word access	read-only

Data types for the CV-series:

Mnemonic	Range	Address Width	Access
IR	0.0 to 2555.15	Bit access	
IR	0 to 2555	Word access	
IRd	0 to 2554	Double-word access	
GR	0.0 to 255.15	Bit access	
GR	0 to 255	Word access	
GRd	0 to 254	Double-word access	
AR	0.0 to 511.15	Bit access	
AR	0 to 511	Word access	
ARd	0 to 510	Double-word access	
DM	0 to 24575	Word access	
DMd	0 to 24575	Double-word access	
EM	0 to 32765	Word access	
EMd	0 to 32764	Double-word access	
TIM	0 to 1023	Word access	read-only
CNT	0 to 1023	Word access	read-only

5.32.3.1 Data Type Orientation

a) Alphanumerical Texts
These data are interpreted in the PLC-conforming byte order for words.

b) Floating Point
These data are interpreted in IEEE floating point format.

c) Binary Variables with a Length of 2 or 4 Bytes
Data with a length of 2 bytes are interpreted in the PLC-conforming byte order for words.
Data with a length of 4 bytes are interpreted in the PLC-conforming byte order for double words.

5.32.4 Poll Area

The poll area must reside in the data memory area and be addressed as a data memory word (DM).

Example:

Word address	Reference	High-byte	Low-byte
Word address +0	DM100	Write coordination byte	Reserved
Word address +1	DM101	Message channel, high-byte	Message channel, low-byte
Word address +2	DM102	Function key LEDs 1 to 4	LEDs 5 to 8
Word address +3	DM103	Function key LEDs 9 to 12	LEDs 13 to 16
Word address +4	DM104	Function key LEDs 17 to 20	LEDs 21 to 24
Word address +5	DM105	Function key LEDs 25 to 28	LEDs 29 to 32

5.32.5 Parallel Message System

The parallel message system must reside in the data memory area and be addressed as a data memory word (DM).

Example:
Word address + 0 DM 100
Word address + 1 DM 101

5.32.6 Physical Interfacing

Pin assignment of the TesiMod RS232c interface:

Pin	Ass.	Designation	Function
1	-	*DCD*	*Data Carrier Detect Signal*
2	x	RD	Receive Data
3	x	TD	Transmit Data
4	x	DTR	Data Terminal Ready
5	x	GND	Ground
6	-	*DSR*	*Data Set Ready*
7	x	RTS	Request to Send
8	x	CTS	Clear to Send
9	-	*RI*	*Ring Indicator*

Pin assignment of the TesiMod RS422 / RS485 interface

Pin	Ass.	Designation	Function
1	x	Shield	Shielding
2	x	T(A)	Transmit Data Channel A
3	x	R(A)	Receive Data Channel A
4	x	RTS(A)	Request to Send Channel A
5	x	CTS(A)	Clear to Send Channel A
6	x	*TXCK(B)*	*Transmitting Clock (in special models only)*
7	x	*RXCK(B)*	*Receiving Clock (in special models only)*
8	x	SG	Signal Ground
9	x	T(B)	Transmit Data Channel B
10	x	R(B)	Receive Data Channel B
11	x	RTS(B)	Request to Send Channel B
12	x	CTS(B)	Clear to Send Channel B
13	x	*TXCK(A)*	*Transmitting Clock (in special models only)*
14	x	*RXCK(A)*	*Receiving Clock (in special models only)*
15	-	nc	not assigned

Pins marked - are not assigned
Pins in *italic print* are only assigned in special models

Pin assignment of the RS232c universal interface

Pin	Designation	Interface	Function
8	T(A)	X2.2	Transmit Data
9	T(B)	X2.2	Transmit Data
11	SGND	X2.2	Signal Ground
22	RD(A)	X2.2	Receive Data
23	RD(B)	X2.2	Receive Data

Pin assignment of the RS485 universal interface

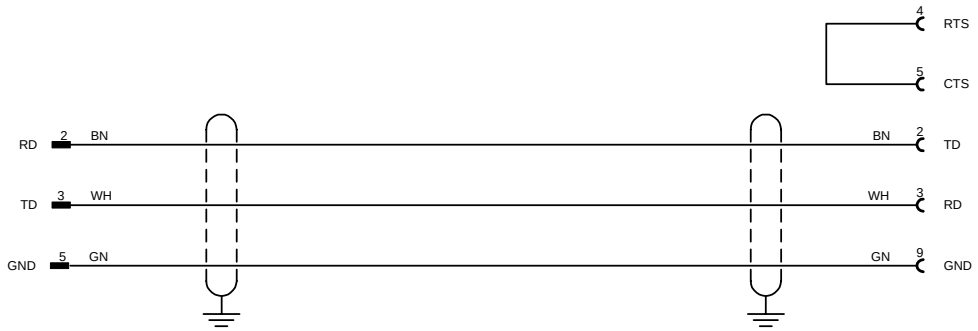
Pin	Designation	Interface	Function
1	Shield	X2.4	Shielding
6	TD	X2.4	Transmit Data
18	RD	X2.4	Receive Data
17	RTS	X2.4	Request To Send
15	CTS	X2.4	Clear To Send
25	SGND	X2.4	Signal Ground

5.32.6.1 Connecting Cable RS232 - OMRON NT-Link

The following wiring diagram does not apply to operating terminals with combination interfaces or universal interfaces.

TesiMod
Operating Terminal

OMRON PLC
RS232



D-Subminiature
Male Connector
9-pin

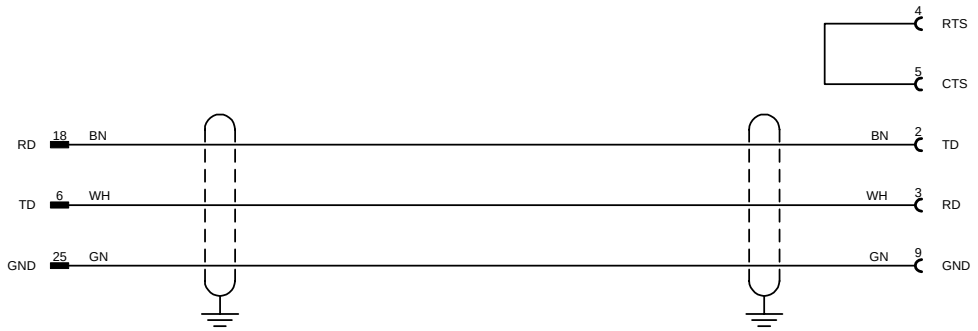
D-Subminiature
Male Connector
9-pin

5.32.6.2 Connecting Cable Universal Interface RS232c - OMRON NT-Link

The following wiring diagram applies to operating terminals with a universal interface only.

TesiMod
Operating Terminal
Universal Interface

OMRON PLC
RS232



D-Subminiature
Male Connector
25-pin

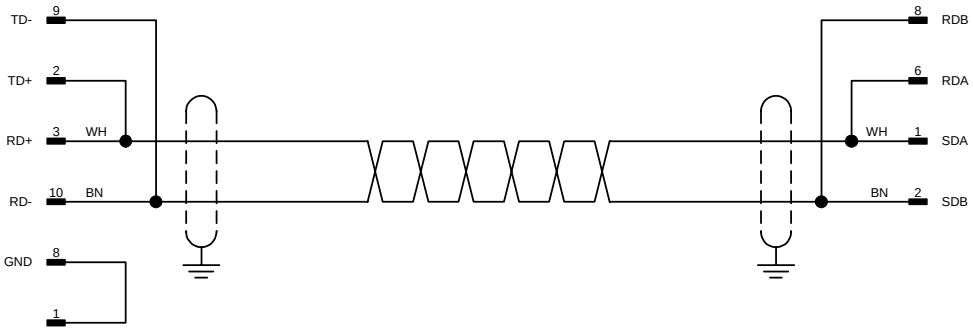
D-Subminiature
Male Connector
9-pin

5.32.6.3 Connecting Cable RS422/RS485 2-Wire - OMRON NT-Link

The following wiring diagram does not apply to operating terminals with combination interfaces or universal interfaces.

TesiMod
Operating Terminal

OMRON PLC
RS422 / RS485



D-Subminiature
Male Connector
15-pin

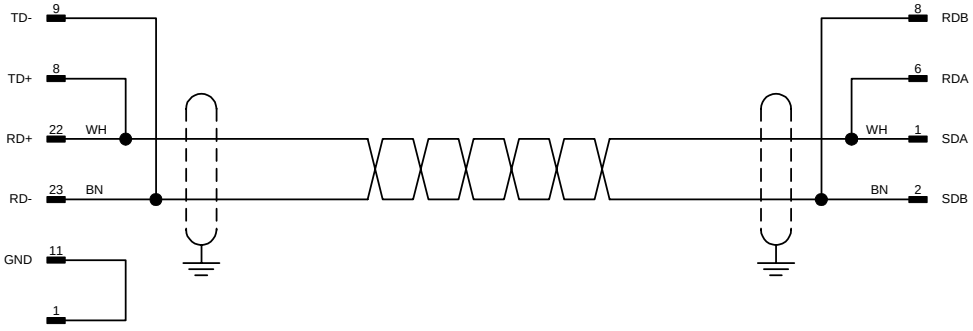
D-Subminiature
Male Connector
9-pin

5.32.6.4 Connecting Cable Universal Interface RS422/RS485 2-Wire - OMRON NT-Link

The following wiring diagram applies to operating terminals with a universal interface only.

TesiMod
Operating Terminal
Universal Interface

OMRON PLC
RS422 / RS485



D-Subminiature
Male Connector
25-pin

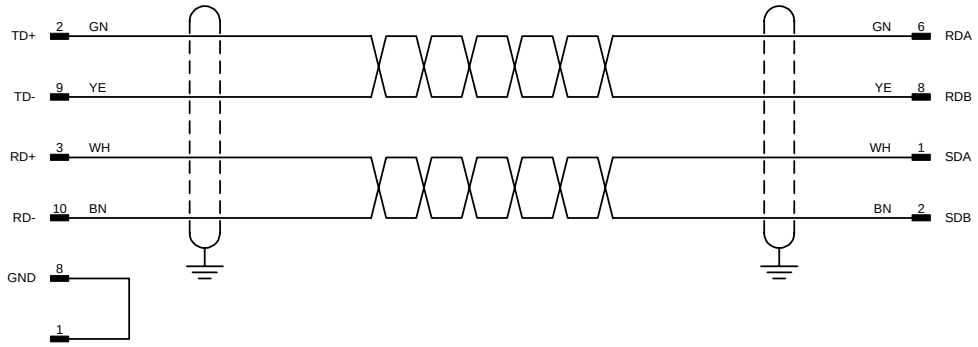
D-Subminiature
Male Connector
9-pin

5.32.6.5 Connecting Cable RS422/RS485 4-Wire - OMRON NT-Link

The following wiring diagram does not apply to operating terminals with combination interfaces or universal interfaces.

TesiMod
Operating Terminal

OMRON PLC
RS422 / RS485



D-Subminiature
Male Connector
15-pin

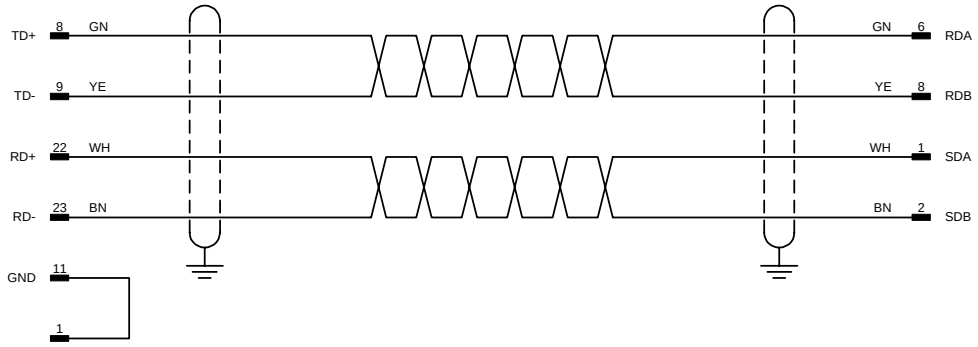
D-Subminiature
Male Connector
9-pin

5.32.6.6 Connecting Cable Universal Interface RS422/RS485 4-Wire - OMRON NT-Link

The following wiring diagram applies to operating terminals with a universal interface only.

TesiMod
Operating Terminal
Universal Interface

OMRON PLC
RS422 / RS485



D-Subminiature
Male Connector
25-pin

D-Subminiature
Male Connector
9-pin

5.32.7 Error Messages

Code 50 E_HARDWARE ..... Communication error on the hardware level

Subcode

3 ..... E_FRAME ..... Protocol frame error
6 ..... E_PARITY ..... Parity error
10 ..... E_NO_DEFINE ..... Poll area not defined
16 ..... E_OVERRUN ..... Receive buffer overrun
40 ..... E_SYS_ADDRESS ..... Access to unknown system address

Code 60 E_PROTOKOL ..... Communication error on the protocol level

Subcode

10 ..... E_RESPONSE_TIMEOUT ..... No response from PLC
20 ..... E_WRONG_PROTOKOL ..... Terminal setting = 1:1, Controller setting= 1:N
30 ..... E_FCS ..... Wrong check sum

Code 70 E_UNDEF_CODE ..... Undefined command
80 E_RESPONSE_CODE ..... Error from PLC

Subcode

00 ..... Error in check sum
01 ..... Undefined command
03 ..... Format contains error
05 ..... Parameters contain error
Possible cause:
- wrong address
07 ..... Status error